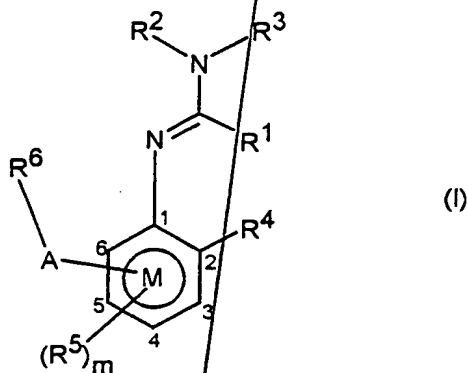


Claims

- 1 The use of a compound of general formula I and salts thereof as fungicides



wherein

$R^1$  is alkyl, alkenyl, alkynyl, carbocyclyl or heterocyclyl, each of which may be substituted, or hydrogen;

$R^2$  and  $R^3$ , which may be the same or different, are any group defined for  $R^1$ ; cyano; acyl;  $-OR^a$  or  $-SR^a$ , where  $R^a$  is alkyl, alkenyl, alkynyl, carbocyclyl or heterocyclyl, each of which may be substituted; or  $R^2$  and  $R^3$ , or  $R^2$  and  $R^1$ , together with their interconnecting atoms may form a ring, which may be substituted;

$R^4$  is alkyl, alkenyl, alkynyl, carbocyclyl or heterocyclyl, each of which may be substituted; hydroxy; mercapto; azido; nitro; halogen; cyano; acyl; optionally substituted amino; cyanato; thiocyanato;  $-SF_5$ ;  $-OR^a$ ;  $-SR^a$  or  $-Si(R^a)_3$ ;

$m$  is 0 to 3;

when present  $R^5$ , which may be the same or different to any other  $R^5$ , is any group defined for  $R^4$ ;

$R^6$  is optionally substituted carbo- or heterocyclyl; and

$A$  is a direct bond,  $-O-$ ,  $-S(O)_n-$ ,  $-NR^9-$ ,  $-CR^7=CR^7-$ ,  $-C\equiv C-$ ,  $-A^1-$ ,  $-A^1-A^1-$ ,  $-O-(A^1)_k-O-$ ,  $-O-(A^1)_k-$ ,  $-A^3-$ ,  $-A^4-$ ,  $-A^1O-$ ,  $-A^1S(O)_n-$ ,  $-A^2-$ ,  $OA^2-$ ,  $-NR^9A^2-$ ,  $-OA^2-A^1-$ ,  $-OA^2-C(R^7)=C(R^8)-$ ,  $-S(O)_nA^1-$ ,  $-A^1-A^4-$ ,  $-A^1-A^4-C(R^8)=N-N=CR^8-$ ,  $-A^1-A^4-C(R^8)=N-X^2-X^3-$ ,  $-A^1-A^4-A^3-$ ,

66

$-A^1-A^4-N(R^9)-$ ,  $-A^1-A^4-X-CH_2-$ ,  $-A^1-A^4-A^1-$ ,  $-A^1-A^4-CH_2X-$ ,  
 $-A^1-A^4-C(R^8)=N-X^2-X^3-X^1-$ ,  $-A^1-X-C(R^8)=N-$ ,  $-A^1-X-C(R^8)=N-N=CR^8-$ ,  
 $-A^1-X-C(R^8)=N-N(R^9)-$ ,  $-A^1-X-A^1-X^1-$ ,  $-A^1-O-A^3-$ ,  $-A^1-O-C(R^7)=C(R^8)-$ ,  
 $-A^1-O-N(R^9)-A^2-N(R^9)-$ ,  $-A^1-O-N(R^9)-A^2-$ ,  $-A^1-N(R^9)-A^2-N(R^9)-$ ,  
 $-A^1-N(R^9)-A^2-$ ,  $-A^1-N(R^9)-N=C(R^8)-$ ,  $-A^3-A^1-$ ,  $-A^4-A^3-$ ,  $-A^2-NR^9-$ ,  
 $-A^1-A^2-X^1-$ ,  $-A^1-A^1-A^2-X^1-$ ,  $-O-A^2-N(R^9)-A^2-$ ,  $-CR^7=CR^7-A^2-X^1-$ ,  
 $-C\equiv C-A^2-X^1-$ ,  $-N=C(R^8)-A^2-X^1-$ ,  $-C(R^8)=N-N=C(R^8)-$ ,  $-C(R^8)=N-N(R^9)-$ ,  
 $-(CH_2)_2-O-N=C(R^8)-$  or  $-X-A^2-N(R^9)-$

where

n is 0, 1 or 2,

k is 1 to 9,

$A^1$  is  $-CHR^7-$ ,

$A^2$  is  $-C(=X)-$ ,

$A^3$  is  $-C(R^8)=N-O-$ ,

$A^4$  is  $-O-N=C(R^8)-$ ,

X is O or S,

$X^1$  is O, S,  $NR^9$  or a direct bond,

$X^2$  is O,  $NR^9$  or a direct bond,

$X^3$  is hydrogen,  $-C(=O)-$ ,  $-SO_2-$  or a direct bond,

$R^7$ , which may be the same or different to any other  $R^7$ , is alkyl, cycloalkyl or phenyl, each of which may be substituted; or is hydrogen, halogen, cyano or acyl;

$R^8$ , which may be the same or different to any other  $R^8$ , is alkyl, alkenyl, alkynyl, alkoxy, alkylthio, carbo- or heterocyclyl, each of which may be substituted; or is hydrogen;

$R^9$ , which may be the same or different to any other  $R^9$ , is optionally substituted alkyl, optionally substituted carbo- or heterocyclyl, hydrogen or acyl; or two  $R^9$  groups on A, together with the connecting atoms, form a 5 to 7 membered ring;

where the moiety depicted on the right side of linkage A is attached to  $R^6$ ;

67

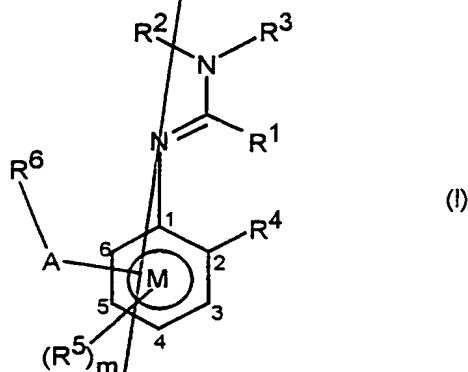
or -A-R<sup>6</sup> and R<sup>5</sup> together with benzene ring M form an optionally substituted fused ring system.

- 2 The use according to claim 2 wherein R<sup>1</sup> is alkyl, alkenyl or alkynyl, each  
5 of which may be substituted by alkoxy, haloalkoxy, alkylthio, halogen or optionally substituted phenyl; or is hydrogen.
- 3 The use according to claim 1 wherein R<sup>1</sup> is C<sub>1</sub>-C<sub>10</sub> alkyl or hydrogen.
- 10 4 The use according to any preceding claim wherein R<sup>2</sup> and R<sup>3</sup>, which may be the same or different, are alkyl, alkenyl or alkynyl, each of which may be substituted by alkoxy, haloalkoxy, alkylthio, halogen, optionally substituted phenyl; or is hydrogen; alkoxy; alkoxyalkoxy; benzyloxy; cyano; or alkylcarbonyl.
- 15 5 The use according to claim 4 wherein R<sup>2</sup> and R<sup>3</sup>, which may be the same or different, are C<sub>1</sub>-C<sub>10</sub> alkyl or hydrogen.
- 20 6 The use according to any preceding claim wherein R<sup>4</sup> is alkyl, alkenyl, or alkynyl, each of which may be substituted by alkoxy, haloalkoxy, alkylthio, halogen or optionally substituted phenyl; or is hydroxy; halogen; cyano; acyl; alkoxy; haloalkoxy; or alkylthio.
- 25 7 The use according to claim 6 wherein R<sup>4</sup> is C<sub>1</sub>-C<sub>10</sub> alkyl or halogen.
- 8 The use according to any preceding claim wherein m is 0 or 1.
- 9 The use according to any preceding claim wherein, when present, R<sup>5</sup> is a group defined for R<sup>4</sup> in claim 6.
- 30 10 The use according to any preceding claim wherein when present, the group R<sup>5</sup> is attached at the 5 position of ring M.

- 11 The use according to any preceding claim wherein A is a direct bond, -O-,  
-S(O)<sub>n</sub>A<sup>1</sup>-, -O(A<sup>1</sup>)<sub>k</sub>-, -S(O)<sub>n</sub>-, -NR<sup>9</sup>A<sup>2</sup>-, -A<sup>2</sup>-, -OA<sup>2</sup>-, -OA<sup>2</sup>-A<sup>1</sup>-, -NR<sup>9</sup>- or  
-O(A<sup>1</sup>)<sub>k</sub>O-.
- 5 12 The use according to claim 11 wherein A is a direct bond, -O-, -S-, -NR<sup>9</sup>-,  
-CHR<sup>7</sup>- or -O-CHR<sup>7</sup>-.
- 13 The use according to any preceding claim wherein, when present, R<sup>9</sup> is  
10 haloalkoxy, alkylthio, halogen or optionally substituted phenyl; or is  
hydrogen
- 14 The use according to any preceding claim wherein, when present, R<sup>7</sup> is  
alkyl, alkenyl, or alkynyl, each of which may be substituted by alkoxy,  
15 haloalkoxy, alkylthio, halogen or optionally substituted phenyl; or is  
hydroxy; halogen; cyano; acyl; alkoxy; haloalkoxy; alkylthio; or hydrogen.
- 15 The use according to any preceding claim wherein A is attached to the 4  
position of benzene ring M.
- 20 16 The use according to any preceding claim wherein R<sup>6</sup> is optionally  
substituted phenyl or optionally substituted aromatic heterocyclyl.
- 17 The use according to any preceding claim wherein when substituted, R<sup>6</sup>  
25 may be substituted by one or more substituents, which may be the same or  
different, and may be selected from the list: alkyl, alkenyl, alkynyl, carbo-  
or heterocyclyl, each of which may be substituted; hydroxy; mercapto;  
azido; nitro; halogen; cyano; acyl; optionally substituted amino; cyanato;  
thiocyanato; -SF<sub>5</sub>; -OR<sup>a</sup>; -SR<sup>a</sup> and -Si(R<sup>a</sup>)<sub>3</sub>, where R<sup>a</sup> is alkyl, alkenyl,  
30 alkynyl, carbocyclyl or heterocyclyl, each of which may be substituted.
- 18 The use according to claim 17 wherein when substituted, R<sup>6</sup> may be  
substituted by one or more substituents, which may be the same or

different, and may be selected from the list: hydroxy; halogen; cyano; acyl; amino; alkylamino; dialkylamino; alkyl; haloalkyl;  $R^aO$ -alkyl; acyloxyalkyl; cyano-oxyalkyl; alkoxy; haloalkoxy; alkylthio; carbocyclyl, optionally substituted by alkyl, haloalkyl, alkoxy, haloalkoxy or alkylthio; and benzyl optionally substituted by alkyl, haloalkyl, alkoxy, haloalkoxy or alkylthio.

19 The use of a compound of general formula I and salts thereof as fungicides



wherein:

$R^1$  is alkyl, alkenyl or alkynyl, each of which may be substituted by alkoxy, haloalkoxy, alkylthio, halogen or phenyl optionally substituted by alkyl, haloalkyl, alkoxy, haloalkoxy, alkylthio or halogen; or is hydrogen;

$R^2$  and  $R^3$ , which may be the same or different, are as defined for  $R^1$ , or are alkoxy, alkoxyalkoxy, benzyloxy, cyano or alkylcarbonyl;

$R^4$  is alkyl, alkenyl or alkynyl, each of which may be substituted by alkoxy, haloalkoxy, alkylthio, halogen or phenyl optionally substituted by alkyl, haloalkyl, alkoxy, haloalkoxy, alkylthio or halogen; or is hydroxy; halogen; cyano; or acyl;

$m$  is 0 or 1;

when present,  $R^5$  is a group defined for  $R^4$ ;

$A$  is a direct bond,  $-O-$ ,  $-S-$ ,  $-NR^9-$ ,  $-CHR^7-$  or  $-O-CHR^7-$ ,

wherein, when present,  $R^9$  is alkyl, alkenyl, or alkynyl, each of which may be substituted by alkoxy, haloalkoxy, alkylthio, halogen or phenyl optionally substituted by alkyl, haloalkyl, alkoxy, haloalkoxy, alkylthio, or halogen; or is hydrogen; and  $R^7$  is a group defined for

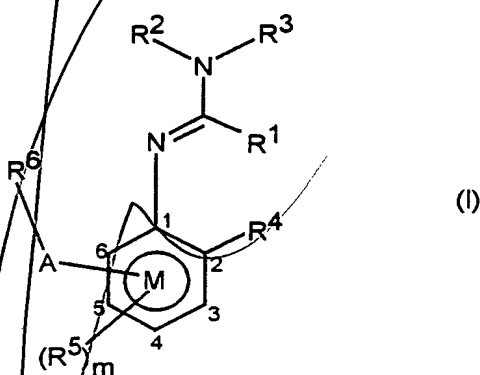
70

$R^9$ , or is hydroxy; halogen; cyano; acyl; alkoxy; haloalkoxy or alkylthio;

A is attached to the 4 position of benzene ring M; and

$R^6$  is phenyl or aromatic heterocyclyl, optionally substituted by one or more substituents, which may be the same or different, and may be selected from the list: hydroxy; halogen; cyano; acyl; amino; alkylamino; dialkylamino; alkyl; haloalkyl;  $R^aO$ -alkyl; acyloxyalkyl; cyano-oxyalkyl; alkoxy; haloalkoxy; alkylthio; carbocyclyl, optionally substituted by alkyl, haloalkyl, alkoxy, haloalkoxy or alkylthio; and benzyl optionally substituted by alkyl, haloalkyl, alkoxy, haloalkoxy or alkylthio.

A compound of general formula I and salts thereof



wherein

$R^1$  is alkyl, alkenyl, alkynyl, carbocyclyl or heterocyclyl, each of which may be substituted, or is hydrogen;

$R^2$  and  $R^3$ , which may be the same or different, are any group defined for  $R^1$ , or together with the nitrogen to which they are attached may form a ring, which may be substituted;

$R^4$  is alkyl, alkenyl, alkynyl, carbocyclyl or heterocyclyl, each of which may be substituted;

m is 1;

$R^5$  is any group defined for  $R^4$  attached to the 5-position of the benzene ring M;

$R^6$  is optionally substituted carbo- or heterocyclyl; and

A is a direct bond; -O-; -S-; -NR<sup>9</sup>- where R<sup>9</sup> is alkyl, alkenyl, or alkynyl, each of which may be substituted by alkoxy, haloalkoxy, alkylthio, halogen or optionally substituted phenyl; -CHR<sup>7</sup>- or -O-CHR<sup>7</sup>-, where R<sup>7</sup> is alkyl, alkenyl, or alkynyl, which may be substituted by alkoxy, haloalkoxy, alkylthio, halogen or phenyl optionally substituted by alkyl, haloalkyl, alkoxy, haloalkoxy or alkylthio; or is hydroxy; halogen; cyano; acyl; alkoxy; haloalkoxy; or alkylthio;

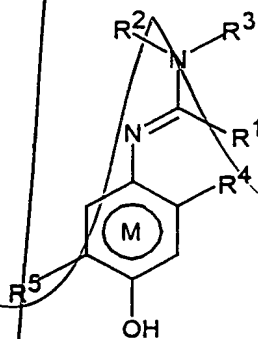
where -A-R<sup>6</sup> is in the 4-position of the benzene ring M and the moiety depicted on the right side of linkage A is attached to R<sup>6</sup>;

or -A-R<sup>6</sup> and R<sup>5</sup> together with benzene ring M form an optionally substituted fused ring system.

A fungicidal composition comprising at least one compound as claimed in claim 20 in admixture with an agriculturally acceptable diluent or carrier.

A method of combating fungi at a locus infested or liable to be infested therewith, which comprises applying to the locus a compound as defined in any preceding claim.

A compound of general formula XIIa,



(XIIa)

where

R<sup>1</sup> is alkyl, alkenyl, alkynyl, carbocyclyl or heterocyclyl, each of which may be substituted, or is hydrogen;

R<sup>2</sup> and R<sup>3</sup>, which may be the same or different, are any group defined for R<sup>1</sup>; cyano; acyl; -OR<sup>a</sup> or -SR<sup>a</sup>, where R<sup>a</sup> is alkyl, alkenyl, alkynyl,

carbocyclyl or heterocyclyl, each of which may be substituted; or R<sup>2</sup> and R<sup>3</sup>, or R<sup>2</sup> and R<sup>1</sup>, together with their interconnecting atoms may form a ring, which may be substituted;

R<sup>4</sup> is alkyl, alkenyl, alkynyl, carbocyclyl or heterocyclyl, each of which may be substituted; and

R<sup>5</sup> is any group defined for R<sup>4</sup>;

with the proviso that R<sup>5</sup> is not *tert*-butyl.

5